

# THE HOTS-BASED AFL MODEL TO INCREASE OF HIGHER ORDER THINKING SKILLS OF STUDENT TEACHERS OF CLOTHING VOCATIONAL EDUCATION

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## Abstract

This study aims: (1) to develop a model of HOTS-based AFL which can be used to increase higher order thinking skills (HOTS) of student teachers of clothing vocational education in college; (2) to investigate the effectiveness of the developed model of HOTS-based AFL to increase of higher order thinking skills (HOTS) of student teachers of clothing vocational education. This study is a development research, using HC-ADDIE modification model that is the collaboration and modification of the research, development, and diffusion (RDD) of Hopkins & Clark model with ISD-ADDIE model and the classroom action research. The stages of research include analysis and needs assessment. The stages of development include designing prototype models, validating model, testing reliability, training lecturer/observer, conducting limited and extended trials as implementation, analysis, and evaluation through the classroom action research. The stages of diffusion include the dissemination of research results through seminars and journals. The subjects of this study were student teachers majoring in the field of clothing of vocational education in the first semester of 2012/2013 at Clothing Technical Education Program, Faculty of Engineering, Yogyakarta State University. The data analysis used the descriptive statistical techniques with the presentation in the form of tables, graphs, and diagrams, as well as using inferential statistical techniques namely one-way ANOVA. The process of data analysis used Excel and SPSS for Windows 17.0 program. The results of this study are as follows: (1) The HOTS-based AFL model for the learning of clothing to the student teachers of clothing vocational education is successfully developed through the HC-ADDIE modification model. (2) The HOTS-based AFL model is effective to increase the student's HOTS.

**Keywords:**AFL, HOTS, studentteachers of clothing vocational education.

## Introduction

The era of globalization followed by the era of knowledge and a very fast changing world has implications for many areas of life, including of clothing vocational education in college. Faced with these conditions, clothing vocational education in college should be able to prepare the next generation in order that they have the higher order thinking skills (HOTS) so they able to critical thinking, researching, problem solving, decision making, and good character, appropriately and wisely. This is in line with the opinion of Delisle (1997, p.4) that in order to face of the rapidly changing world, education in the 21st century should develop the habit of thinking, researching, and solving problems. Similar feeling were expressed by Rose & Nicholl (2002, p.13) namely that in order to deal with change very quickly, then the students need to be given

about how the provision of learning and how to think.

Clothing vocational education in college also must be able to prepare graduates to be able to enter the work force as per the requirements specified. Cotton (1993, p.2) and Robinson (2000, pp.1-3) states that to enter the world of work, the candidate must have a workforce readiness, abilities, and skills required by employability skills, one of which is HOTS. According to Robinson (2000, p.3), by having HOTS then some one will be able to learn, provide precise reason, creative thinking, make a decision, and solve problems.

Some of the capabilities mentioned above can be achieved if someone is able to applying the knowledge, analyzing problems, evaluating problems, and drafting alternative solutions based on knowledge and understanding which has been owned. Some indicators of this ability are summarized in

HOTS, so this should HOTS shared by all students, including student teachers of the clothing vocational education in college. Therefore, the development of HOTS be a very important thing to be considered in the curriculum of clothing vocational education in college.

Related to the above, Thomas & Litowitz (1986, p.1) stated that the main focus in all areas of education today is the impact of education on students' ability in using HOTS. Understanding and increased knowledge, cognitive abilities, and the placement of the lead, organize, and form effective action in the workplace, family, and community is a significant issue for vocational education. This suggests that HOTS be a very important thing that should be implemented and improved in vocational education programs, including clothing vocational education in college.

Accordingly, the HOTS development of students of clothing vocational education in college demands that must be done, given the characteristics of work in the field of fashion, among others, is to produce a clothing (fashion) related with the fashion world that is in need of creative and critical thinking skills. Because, the process creation of fashion either mass-produced or individually require problem solving and long process that started from: (1) developing the concept of the product, (2) designing products which include making product design, make construction product patterns , and tableware patterns corresponding product design, (3) selecting of raw materials, (4) determining of the technology used in the production process, (5) processing products, (6) controlling product quality, (7) finishing products, and up to (8) marketing products (promotional products). Therefore, students as prospective teachers of clothing vocational education must be ready and able to teach science in the field of fashion to the students well in the future in accordance with the demands of a globalized world.

The above is supported by the statement of Kerka (1992, p.2) in his article entitled Higher Order Thinking Skills in Vocational Education that HOTS is very crucial and needed in the field of vocational education, including clothing. The reason is that students are able to solve problems, make decisions, give reasons (arguments),

and quickly adapt to the work environment and work. In addition, Kerka (1992, p.2) explains that the vocational education, including clothing vocational education in college requires learning strategies and assessment methods to develop new alternative HOTS of the students vocational education.

Accordingly, the development of the HOTS of students of clothing vocational education is one way to generate human resources in the field of fashion that critical and creative that is ready and able to adapt quickly in the world of work and be able to face increasingly complex global challenges. By having HOTS, the students will be able to resolve problems related to the field of work and life (Kerka, 1992, p.2). Therefore, the development of the HOTS of students clothing vocational education can be directed at the development of critical thinking skills, systematically skills, logical, applicative, analytical, evaluative, creative, problem solving, and decision making in an honest, self-confident, responsible and independent as candidates for professional employment in the field of fashion. The hope is that students have the HOTS can use these abilities for career development in the workplace and life.

In line with the above, Nevin (1997, p.15) in the Journal of Vocational and Technical Education (JVTE) explains that the strategy of collaborative learning in vocational education programs should be to develop the students' problem solving skills and HOTS in real-world applications related to the work. Referring to this, it may be mentioned that vocational education programs should emphasize the development of problem solving skills and HOTS for students who can be useful to solve problems in real life and work later.

The description of above is supported by the results of the Miarso's study (2009, p.7) that mapping vocational education graduates who concluded that in order to adapt quickly to the rapidly evolving work environment, vocational education programs need to be developed on the basis of extensive knowledge and technologies. The programs that are leading or narrow, less relevant to the demands of the workplace. Ideally, the program was developed not only oriented towards the development of skills alone, but also oriented toward the process

to develop the ability to think logically, ethical, and aesthetic, as well as the ability to adapt to the development environment and the demands of the workplace.

Looking at the above description, it can be said that HOTS is an essential skill for the success of the study, work, and live in the information age and technology of the 21st century. HOTS and its components can be developed and used well when studying a science. Therefore, the process of learning and assessment in the field of fashion colleges need to emphasize the development of students' HOTS. In this case, the lecturer should ask the students to use the HOTS which includes the ability to applying, analyzing, evaluating, and creating for learning activities through: discussions, fieldwork, practicum, and students evaluate their own that skill.

Given the above, it is to be able to develop of students' HOTS, the assessment system should be integrated in the learning process (assessment for learning-AFL) and lead to the development of critical thinking skills (HOTS-based AFL). Related to this above, the result of research Barak &Dori (2009) can to become a reference in develop of HOTS of students of clothing vocational education in college. The results of research Barak &Dori (2009) which examines how to improve HOTS science student teachers through embedded assessment in learning. Barak &Dori found that by implementing an integrated assessment of learning, it can increase the HOTS students. Referring to the research, then the development of students HOTS can be done through the application of the assessment model that integrated in learning system. The assessment model that integrated in learning and ongoing in learning processes called the formative assessment or often also called assessment for learning (AFL) (Earl, 2003; Goode, et.al, 2010, p.21). Supporting this statement, Smith & Cumming (2009, p.10) had a notion that to prepare the next generation who capable to face global challenges in 21<sup>st</sup> century, then needed a change of assessment system that be able to direct aspiration, motivation, and individual effort to learn, one of them is assessment for learning (AFL).

Different of the assessment model that be done in the end of learning or called of summative assessment or often also called

assessment of learning (AOL), AFL to be done ongoing in learning process. Thus, implementation of AFL integrated in learning process, so AFL have influence directly in learning of students with enforce the relationship between assessment and instruction (Goode, et.al, 2010, p.21). Superiority of AFL that is be able: to detect the students' weakness and students' strength, to detect students ability position in learning based on criteria not compare with another students, involve the lecturer and students in the implementation process, and be able to help the students and lecturer in achieved the expected of learning goal. In addition, the AFL be able to enhance of motivation, responsibility, self-confidence, independence, honesty, and achievement of students in learning (Moore & Stanley, 2010, p.21; ARG, 1999, p.7; Stiggins & Chappuis, 2005, p.11; Davies, 2000, p.12; Stiggins, 2002, p.9; Arter, 2002, p.2; Garies& Grant, 2008, p. 8).

Whereas AOL more oriented at the results of learning and be done in the end of learning (summative assessment), to used confirm what the students have known, to shown were the students have achieved a standard of competencies that given, to know the students position in class that compare with others, and be intended to explain the students of learning results as form of report to parents and students about their progress in school (Earl, 2003, p.4). The characteristic of AOL have a weakness refer to the students' need and lecturer's need to improve learning quality. The students' weakness and strength could not detected well done by lecturer so she is not help solve the problem of students.

Accordingly, the learning process of clothing in college necessary to implement AFL beside AOL that have done. The AFL model is suitable for all situations and can provide benefits for faculty and students in identifying next learning steps necessary to make progress, strengths and weaknesses of the student (CEA, 2003; ARG, 1999).

Meanwhile, HOTS which includes the skills to analyze, evaluate, and synthesize or create requires a variety of measures of learning and teaching that is different than just learn facts and concepts alone. HOTS include learning activities in deciding on matters that are complex thinking such as

critical thinking and problem solving. Although HOTS is difficult to learn and be taught, but must be included in the study because its usefulness is not in doubt. Therefore, the HOTS-based AFL model assessed suitable to be applied in the learning field of clothing (fashion) in college.

Accordingly, it is necessary to develop a models of HOTS-based AFL that can be applied in the learning field of clothing in college. Because, until now HOTS-based AFL model is not yet available. The model of HOTS-based AFL is a model of the assessment carried out during the learning progress (ongoing) to collect information about student learning conditions in order to improve the understanding and HOTS of students of clothing vocational education in college.

Looking at the above description, it is necessary to do a research on models of HOTS-based AFL in learning of clothing in the college. Related to this, the issues raised are as follows: (1) How to development procedures of HOTS-based AFL model in learning field of clothing in college? (2) How effectiveness of HOTS-based AFL model to increasing HOTS of student teachers of clothing vocational education in college?

Based on the issues raised above, the study aims: (1) to develop a model of HOTS-based AFL for the learning field of clothing in the college, (2) to investigate the effectiveness of the HOTS-based AFL model to increasing HOTS of student teachers of clothing vocational education in college.

The develop product of research is a model of HOTS-based AFL that can used as a alternative assessment model to learning field of clothing in college. The objective of the product research is to increasing HOTS of student teachers of clothing also learning quality in college. The HOTS-based AFL model includes: (1) the goal of model; (2) the characteristic of model; (3) the component of model; (4) the instrument of model; (5) the procedure (syntax) of model; and (6) the guidelines of model.

Accordingly, the results of this study would be useful to researchers, students, professors, clothing vocational education, institutional providers of vocational education in colleges, and the Higher Education, both theoretically and practically.

## **Methods**

### **Types of Research**

This study is a development research, using HC-ADDIE modification model that is the collaboration and modification of the research, development, and diffusion of Hopkins & Clark model with ISD-ADDIE model and the classroom action research. The stages of research include analysis and needs assessment. The stages of development include designing prototype models, validating model, testing reliability, training lecturer/observer, conducting limited and extended trials as implementation, analysis, and evaluation through the classroom action research. The stages of diffusion include the dissemination of research results through seminars and journals.

### **Time and Place of Research**

This research was conducted in odd semester 2012/2013 during one semester namely September-December, 2013 at the Department of Clothing Technical Education, Department of Catering and Clothing Technical Education, Faculty of Engineering, Yogyakarta State University.

### **The Subject of Research**

The subjects of this study were students majoring in the field of clothing of vocational education in the first semester of 2012/2013 at Clothing Technical Education Program, Faculty of Engineering, Yogyakarta State University, as many as 92 students and 4 lecturers.

### **Procedure**

The procedure of this study is done through development procedures of HOTS-based AFL model which includes three steps: (1) a research stage, (2) development stage, and (3) diffusion stage. Stages of research include: (a) analysis of the problem, and (b) the analysis of needs (needs assessment) based on the results of the preliminary study and theoretical as well as empirical studies (research results related to HOTS, AFL, and vocational education), (2) stages development, include: activities of designing of prototype HOTS-based AFL model,

validation activities by experts, readability test models, training lecturers / observer, and trial activity of model (implements, analysis, & evaluate) approach through classroom action research (CAR) so as to produce models of HOTS-based AFL that fit, and (3) diffusion stages that include dissemination activities through socialization and journals.

### **Data, Instruments, and Data Collection Techniques**

The research data in the form of quantitative and qualitative data. Quantitative data includes data of students' understanding and HOTS. Data on students' understanding and HOTS obtained through the provision of a HOTS-based matter/task completed with assessment rubric in the form of descriptions (essay), lab assignments, discussions, and task creation of fashion products, according to the learning objectives and competencies to be achieved. While qualitative data includes the data validation results obtained from the results of assessment of HOTS-based AFL model by the experts.

### **Data Analysis Techniques**

The data analysis used the descriptive statistical techniques with the presentation in the form of tables, graphs, and diagrams, as well as using inferential statistical techniques namely one-way ANOVA. The process of data analysis used Excel and SPSS for Windows 17.0 program.

### **The Finding of Research**

#### **a. The Development Results of the HOTS-Based AFL Model**

The model of HOTS-based AFL successfully developed through the development of research using HC-ADDIE modification model, and have been declare by experts that it is valid and reliable. The model of HOTS-based AFL is successfully developed through this research have the following specifications:

(1) In terms of destination, the model HOTS-based AFL can be used to assess, increase, and develop HOTS of student

teachers of clothing vocational education in college.

(2) In view of the characteristics of the model, the model of HOTS-based AFL has the following characteristics:

- a) Assessment process is integrated in the learning process and are on-going so that the weaknesses and strengths of students can be detected by either
- b) Assessment process applying the concepts, principles, strategies, and the four elements (components) of AFL namely: (a) sharing learning goals, criteria of success, and the criteria of assessment, (b) using effective questioning, (c) self-assessment and self-reflection, and (d) the corrective and effective feedback.
- c) The application of the model of HOTS-based AFL able to bring up information on learning about the students' HOTS in the learning process
- d) Assessment process aims to increase HOTS of student teachers of clothing vocational education, so the assessment process focuses on developing the ability to applying, analyzing, evaluating, and creating. Therefore, the problem / task given the emphasis on increasing and development of HOTS of students (based-HOTS)
- e) Lecturers can provide about HOTS-based tasks such as problems to students for discussion and problem-solving activities to stimulate student thinking
- f) Assessment activities can be applied to learning theory (by way of applying problem-based learning) and learning practices (by way of implementing project-based learning)

(3) In terms of the components of the model, the model of HOTS-based AFL has components include:

- a) Components teaching and learning, shall be composed of: students, faculty, teaching materials, syllabi and lesson plans, and instrument HOTS-based AFL (problem / task HOTS-based, scoring guidelines and scoring rubric, assessment sheets and students' HOTS, self-assessment sheets and students' self-reflection,

feedback sheet, and the sheet valuation report (student profile)

- b) Implementation Guide Component HOTS-based AFL
  - c) The process of assessment and observation using the instrument HOTS-based AFL
  - d) Data assessment and observation
  - e) Provision of feedback to the students
  - f) Report assessment results can be used to improve and enhance the quality of assessment, learning, and HOTS of student teachers of clothing vocational education.
- (4) In terms of instrument models, the model of HOTS-based AFL has instrument effectiveness (functioning) models, which are composed of:
- a) Problem / HOTS-based tasks, scoring guidelines and scoring rubric
  - b) The assessment of the students' HOTS
  - c) The observation of student activities
  - d) The students' attitudes and behavior of student assessment
  - e) The self-assessment and self-reflection of students
  - f) The feedback
  - g) The report assessment results (Student Profile Sheet)
- (5) In terms of procedure (syntax) models, the implementation and execution models in the HOTS-based AFL in learning field of clothing in college will be easier done by faculty and students if it has a clear procedure (syntax). Therefore, the syntax model of HOTS-based AFL is presented as a guide and guidelines for faculty and students in that used. The syntax models contains stages or steps are performed by students and faculty with a systematic and logical sequence and demonstrate the role of students and lecturer in learning and assessment.

HOTS-based AFL model also has advantages such as:

- 1. HOTS-based AFL model can provide an opportunity for lecturers to implement problem-based learning and project-based learning at the same time in learning, so that students can stimulate the activity of thinking.
- 2. Assessment activities in the model of HOTS-based AFL can be done through discussions, field work, lab activities, preparing lab reports, presentations, and projects creating a new product with a

design concept (draft ) products are true and correct

- 3. HOTS-based AFL model is able to effectively increase students' HOTS. This is evidenced by the results of the calculation of the one-way ANOVA (analysis of variance) showed a significant increased on the students HOTS.
- 4. HOTS-based AFL model is able to engage students to perform self-assessment and self-reflection over the state's ability to master their understanding of the material that has been studied.
- 5. HOTS-based AFL model can also provide feedback that is capable of correcting errors or clarify errors (corrective feedback ) to the students
- 6. Model of HOTS-based AFL can display both student profiles (individual profiles and classes profile) comprehensively in a single sheet valuation reports. This valuation report includes profiles seen students' HOTS and profile comprehension and mastery of learning materials based on the results of students' self-assessment and self-reflection.
- 7. HOTS-based AFL model is able to detect the weaknesses and strengths of students in learning so that lecturers can provide help and guidance.
- 8. Model of HOTS-based AFL can provide feedback to the lecturer so that it can be used by lecturers to conduct self-reflection in order to improve the quality of learning and continuous assessment.
- 9. HOTS-based AFL model is able to support lecturers and students to always make improvements and improving the quality of self and learning.

#### **b. Description of The Results of Assessment of Students' HOTS**

The results of assessment of students' HOTS both in limited and extended trials comprehensively in high category, and had been around increase at class mean score in each cycle. The assessment of students' HOTS includes: applying, analyzing, evaluating, and creating. In detail, the increasingly of class mean score of students' HOTS in each cycle both in limited and extended trials showed in Figure 1.



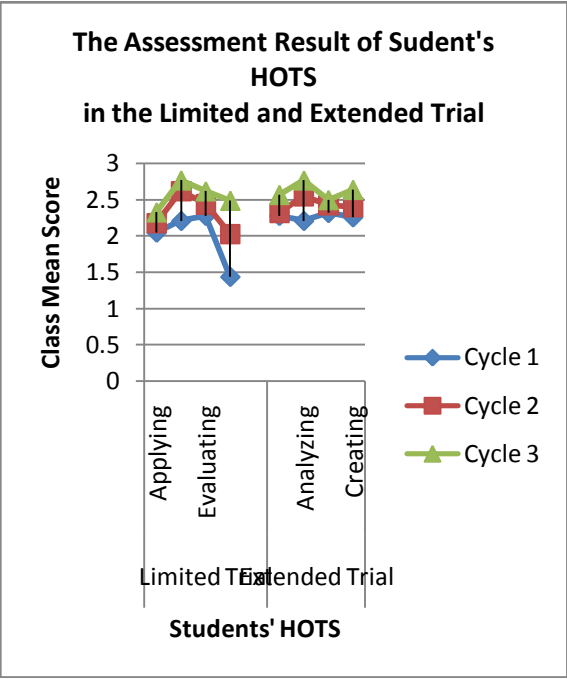


Figure 1. The Graphic of the Increase of Mean Score of Students' HOTS in Each Cycle both Limited and Extended Trials

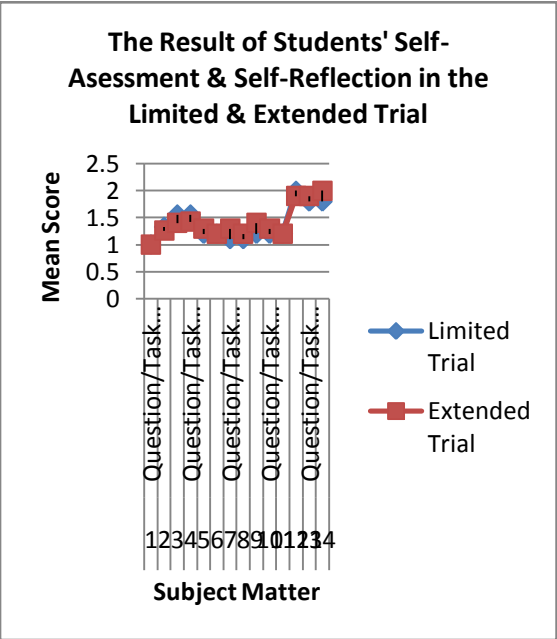


Figure 2. The Graphic of the Results of Students' Self-Assessment and Self-Reflection in Limited and Extended Trials

The results of assessment of students' HOTS showed that the model of HOTS-based AFL which implemented in the learning field of

clothing in college was able to increase students' HOTS. This is supported by results of students' self-assessment and self-reflection when they done in completing a HOTS-based questions/task (job) that given by lecturer. The results of students' self-assessment and self-reflection in understanding and getting of best of subject matter through the HOTS-based questions/task comprehensively both in limited and extended trials belonging to high category, with class mean score 1,39 (69,7%). It's mean that comprehensively, students have understanding and getting of best of subject matters  $\geq 66,5\%$  it well. The results of students' self-assessment and reflection showed in Figure 2.

### c. The effectiveness of the HOTS-Based AFL Model to Increase Students' HOTS

The effectiveness of the HOTS-based AFL model in this study is defined as a success of HOTS-based AFL model in increasing HOTS of student teachers of clothing vocational education in college. While the views of the student HOTS is students' ability to applying, analyzing, evaluating, and creating when solving HOTS-based problems or question/tasks.

The effectiveness of the model of HOTS-based AFL in increasing students' HOTS, it can be determined through the effectiveness test of the model of HOTS-based AFL empirically. The goal is to determine whether the model of HOTS-based AFL capable and effective in increasing students' HOTS. Test of the effectiveness of the model of HOTS-based AFL involves examining whether there are differences in the average value of the performance seen from the students' HOTS between cycle 1, cycle 2, and cycle 3.

Referring to the above, then test the effectiveness of the model of HOTS-based AFL empirically is done by using one-way ANOVA. Measured variable is a good students' HOTS in each cycle, which consists of cycle 1, cycle 2, and cycle 3, in each class. Based on this, the proposed hypothesis can be tested by analysis of variance of these lines, ie as shown in Table 1 .

Table 1. Hypothesis Test Effectiveness of HOTS-based AFLModel to increasing students' HOTS

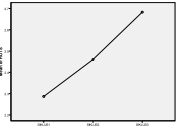
Effectiveness Assessment	Hypothesis
HOTS mahasiswa	Ho: There are not significant differences in the students' HOTS between cycle 1, cycle 2, and cycle 3.
	Ha: There are significant differences in the students' HOTS between cycle 1, cycle 2, and cycle 3.
Criteria of Judgments:	<ul style="list-style-type: none"><li>• If the value of probability (significant) &gt; 0,05, then Ho is accepted.</li><li>• If the value of probability (significant) &lt; 0,05, then Ho is not accepted.</li></ul>

Table 2. Summary of Results of Effectiveness Test Calculations of HOTS-based AFL Model in Increasing Students' HOTS with *One-way* ANOVA

Effectiveness Assessment		Sum of Squares	Df	Mean Square	F	Sig.
Students' HOTS	Between Groups	4,182	2	2,091	19,458	0,000
	Within Groups	16,762	156	0,107		
	Total	20,944	158			

Table 3. Summary of Homogeneous Subsets of Effectiveness Test Calculations of HOTS-based AFL Model in Increasing Students' HOTS with *One-way* ANOVA

TukeyHSD<sub>a,b</sub>

Effectiveness Assessment	Cycle	N	Subset for alpha = 0,05			Means Plots
			1	2	3	
Students' HOTS	Cycle 1	53	2,287			
	Cycle 2	53		2,460		
	Cycle 3	53			2,683	
	Sig.		1,000	1,000	1,000	

While the results of the analysis of variance calculations, homogeneous subsets, and means plots for HOTS of students are summarized in Table 2 and Table 3.

Looking at Table 2 one-way ANOVA summary above, it appears that the probability value or significance of HOTS of student teachers is 0,000, which means < 0,05, so that Ha is accepted or Ho is rejected. This means that there are significant differences between students' HOTS in cycle 1, cycle 2, and cycle 3. Furthermore, to determine whether the three groups was significantly different cycle than other cycle groups can be seen from the output of homogeneous subsets in Table 3.

The results of homogeneous subsets output HOTS students in Table 3 show that

the subset 1 contained only 2,287 cycles with number 1 as the lowest mean, which means students' HOTS in cycle 1 is different from the two other cycles. In the second subset contained only 2 cycles with a mean number 2,460, which means HOTS on cycle 2 different from the other cycle two, and the third subset contained only 3 cycles with a mean number 2,683 as the highest mean, which means HOTS students in cycle 3 is also different from two other cycles. This suggests that the HOTS students between cycle 1, cycle 2, and cycle 3 was significantly different, which means that in cycle 1, cycle 2, and cycle 3 has seen an increase in student HOTS significantly. More specifically, the development trend of HOTS students graph is presented in Figure 3.



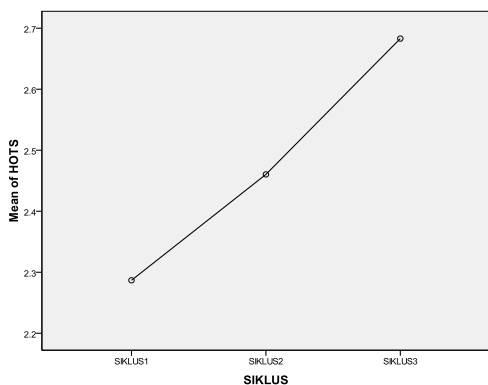


Figure 3.The development trend of Students' HOTS in One Class

Figure 3 illustrates that the development of HOTS students showed an upward trend and consistent, where each cycle an increase in the average score (mean). Trends in the development of the whole student including HOTS quickly, because the start cycle 2 has demonstrated an increase in mean score. In addition, almost reaching the maximum development that is at least indicated by the mean score in cycle 3 (last) by 2,683 (the maximum score is 3.0). In quality, students' HOTS in cycle 1 was still in the criteria, but in cycle 2 and cycle 3 has been increased to high. Thus, it can be stated that the model of HOTS-based AFL able to effectively improve student of clothing vocational education in college.

Based on Table 2 and Table 3 and the above description, it can be concluded that the application of the model of HOTS-based AFL in learning field of clothing vocational education in college were able to significantly increase students' HOTS. This is evidenced by the significantly increased at each cycle, so that it can be said that the model of HOTS-based AFL is effective to increase students' understanding and HOTS. In addition, the development trend graphs of students' HOTS also showed an increasing trend in each cycle. This suggests that the model of HOTS-based AFL capable and can serve to increase HOTS of student teachers of clothing vocational education in college.

## Conclusions and Recommendations

### Conclusions

1. HOTS-based AFL model to increase HOTS of student teacher of clothing vocational education in college successfully

developed through HC-ADDIE modification model. This model is a model of collaboration and modification of Research, Development, Diffusion (RDD) Hopkins & Clark, with a model of Instructional System Design (ISD ) of the development paradigm ADDIE products, and approaches Classroom Action Research (CAR) at the stage of testing in the development phase. Stages of research include analysis activities preliminary studies, theoretical analysis and empirical study (the results of research related to HOTS, AFL, and vocational education), problem analysis, and needs assessment; development stage activities include design prototype models, validation, and test the approach CAR to implement and evaluate well in limited and expanded trials, so that the models and tools (instruments) the model is valid, reliable, and feasible to use both theoretically and empirically; and diffusion stages include dissemination activities through seminars and results journal publications.

- 2 . The results of testing the effectiveness of the model of HOTS-based AFL in increasing HOTS of student teachers of clothing vocational education in college has shown that the model of HOTS-based AFL able to significantly to increase HOTS of student teachers of clothing vocational education in the learning process in college. Thus it can be said that the model of HOTS-based AFL model has proven effective for increasing HOTS of student teachers of clothing vocational education in college. Therefore, the model of HOTS-based AFL is feasible to applied in clothing vocational education in college.

### Suggestion

Specifically, the model of HOTS based AFL in learning field of clothing vocational education in colleges developed are used for the benefit of improving the quality of assessment and students learning and the quality of the vocational education field of clothing. The aim is that students have higher level thinking skills (HOTS). Nonetheless, it is possible that the model of HOTS-based AFL is used in the context of other interests more broadly.

The results of effectiveness test of the model of HOTS-based AFL has shown that the model effectively to increase HOTS of student teachers of clothing vocational education in college. Therefore, the model of HOTS-based AFL can be used and utilized as one of the alternative models of assessment for learning in the field of vocational colleges. In addition, model of HOTS-based AFL can be used as an effort to improve the quality of vocational education and general field of fashion, especially in the field of other vocational colleges.

## Recommendations

All this time, learning assessment system policies in the field of clothing in colleges are still focusing on AOL (assessment of learning) that it still has a weakness, especially on students' HOTS capacity. Associated with this policy, it is recommended for managers at both the college courses, departments, faculties, and universities, that the valuation models namely HOTS-based AFL (assessment for learning) model can be incorporated in the policy assessment model to be applied in higher education. It is with this consideration that based on the results of the study as well as the characteristics and advantages of the model of HOTS-based AFL, then AOL weaknesses mentioned above can be solved by applying the model of HOTS-based AFL in learning of clothing vocational education in college. The model of HOTS-based AFL also empirically proven capable to increase HOTS of student teachers of clothing in college.

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